

APPENDIX B

**Summary of Pumping Test Analyses
Performed in the Powder River Basin
(compiled by Applied Hydrology and Associates, Inc.)**

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft-1)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
Alluvium																		
cmc1, wwrc1	Alluvium:	Caballo Mine T48N, R71W, Sec 21	200	1/27/82	3240	112-168	41	90.0	40.0	5.6	Jacob	429	10.4	2.7E-04	6.6E-06	N/A	confined	assumed confined based on reported saturated thicknesses Caballo Rojo Permit to Mine Application; well completion data on CD accompanying wwrc1
cmc1, wwrc1	Alluvium:	Caballo Mine T48N, R71W, Sec 21	50	1/27/82	3240	109-165	39	83.0	40.0	11.5	Jacob	429	8.2	1.3E-04	3.3E-06	N/A	confined	assumed confined based on reported saturated thicknesses Caballo Rojo Permit to Mine Application; well completion data on CD accompanying wwrc1
tcc1	Alluvium: Wasatch	Buckskin Mine; T52N, R72W	25	12/20/78	1470	12.0-16.0	15		5.0		Theis	148	9.8	2.4E-03	N/A	0.00240	unconfined	assumed unconfined based on shallow completion in alluvium
tcc1	Alluvium: Wasatch	Buckskin Mine; T52N, R72W	76	12/20/78	1470	12.0-16.0	15		5.0		Theis	313	20.9	5.1E-03	N/A	0.00510	unconfined	assumed unconfined based on shallow completion in alluvium
tcc1	Alluvium: Wasatch	Buckskin Mine; T52N, R72W	176	12/20/78	1470	12.0-16.0	15		5.0		Theis	768	51.2	1.2E-02	N/A	0.01200	unconfined	assumed unconfined based on shallow completion in alluvium
tcc1	Alluvium: Wasatch	Buckskin Mine; T52N, R72W	48	1/14/81	294	6.0-19.5	15		2.7		Jacob	868	59.9	1.2E-03	N/A	0.00120	unconfined	assumed unconfined based on shallow completion in alluvium
tcc1	Alluvium: Wasatch	Buckskin Mine; T52N, R72W	53	1/14/81	420	11.0-35.0	15		11.1		Jacob	1079	72.0	2.5E-02	N/A	0.02500	unconfined	assumed unconfined based on shallow completion in alluvium
hitt1 (a)	Alluvium:	Buckskin Mine T52N, R72W, Sec. 32					20					1126	56.3	5.6E-02	N/A	0.05600	unconfined	assumed unconfined based on completion in alluvium; no well names or specific locations given
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 10	33	5/17/83	1410		3		6.9	0.5	Theis	201	17.4	2.3E-01	N/A	0.23000	unconfined	assumed unconfined due to shallow completion in alluvium; partial penetration
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 3	220	5/24/83	1200	5.0-18.0	12		14.4	0.3	Theis	2010	190.3	8.0E-03	N/A	0.00800	unconfined	assumed unconfined due to shallow completion in alluvium; static w.l. after drilling = 13.0 ft

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft²/day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft-1)	Specific Yield (S _y = S)	Confined/ Unconfined (see comments)	Comments		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 3	167	5/24/83	1200	6.0-15.0	12		14.4	0.2	Theis	4253	349.7	1.4E-02	N/A	0.01400	unconfined	assumed unconfined due to shallow completion in alluvium; static w.l.. after drilling = 3.1 ft		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 4	91	5/22/83	720	5.0-20.0	16		6.5	3.7	Boulton	391	24.1	1.5E-02	N/A	0.01500	unconfined	assumed unconfined due to shallow completion in alluvium; static w.l.. after drilling = 10.8 ft		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 6	73	5/13/83	1410	6.5-16.5	6		1.1	0.1	Theis	316	57.6	3.3E-02	N/A	0.03300	unconfined	assumed unconfined due to shallow completion in alluvium		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 6	62	5/13/83	1410	5.0-20.0	10		1.1	0.1	Theis	588	63.0	2.2E-02	N/A	0.02200	unconfined	assumed unconfined due to shallow completion in alluvium		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 6	52	5/10/83	1518	5.0-17.0	10		1.0	0.1	Boulton	52	5.5	6.0E-02	N/A	0.06000	unconfined	assumed unconfined due to shallow completion in alluvium		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 6	3.6	5/10/83	1518	8.0-20.0	3		1.0	0.6	Boulton	216	25.5	2.1E-02	N/A	0.02100	unconfined	assumed unconfined due to shallow completion in alluvium		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 9	43	5/17/83	1410	7.5-12.5	10		6.9	0.7	Theis	584	61.6	2.1E-02	N/A	0.02100	unconfined	assumed unconfined due to shallow completion in alluvium; static w.l.. after drilling = 2.9 ft		
cmc2	Alluvium:	Rawhide Mine; T51N, R72W, Sec. 9	45	5/17/83	1410	6.0-11.0	11		6.9	0.9	Theis	478	41.5	1.2E-02	N/A	0.01200	unconfined	assumed unconfined due to shallow completion in alluvium		
fump1	Alluvium: Channel sand	Fort Union Mine T50N, R71W, Sec.7		Not reported	Not reported	202-260	160	88.0	Not reported		Theis	1.3	0.01	7.9E-05	4.9E-07	N/A	confined	static w.l.. > top of aquifer		
fump1	Alluvium: Channel sand	Fort Union Mine T50N, R72W, Sec.1		Not reported	Not reported	108-306	200	93.0	1.5	2.7	Cooper-Jacob	15	0.07	1.1E-04	5.5E-07	N/A	confined	static w.l.. > top of aquifer		
												MIN	1.34	0.01	7.9E-05	4.9E-07	0.00120			
												MAX	4253.16	349.74	2.3E-01	6.6E-06	0.23000			
												MEDIAN	428.80	33.50	1.3E-02	1.9E-06	0.01800			
												ARITH MEAN	713.31	56.25	2.7E-02	2.7E-06	0.03361			
Upper Ft. Union Coals																				

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
hitt1 (b)	Fort Union/Roland Coal	Rawhide Mine T51N, R72W, Sec. 11					25					7	0.0	2.8E-04	1.1E-05	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Roland Coal	Rawhide Mine T51N, R72W, Sec. 11					25					15	0.6	1.6E-04	6.4E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Roland Coal	Rawhide Mine T51N, R72W, Sec. 11					25					15	0.6	1.7E-04	6.8E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Roland Coal	Rawhide Mine T51N, R72W, Sec. 11					25					16	0.6	1.7E-04	6.8E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Roland Coal	Rawhide Mine T51N, R72W, Sec. 11					25					15	0.6	2.0E-04	8.0E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Smith Coal	Rawhide Mine T51N, R72W, Sec. 11					80					67	0.8	1.6E-03	2.0E-05	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Smith Coal	Rawhide Mine T51N, R72W, Sec. 11					80					57	0.7	2.1E-04	2.6E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations given.
hitt1 (b)	Fort Union/Smith Coal	Rawhide Mine T51N, R72W, Sec. 11					80					42	0.5	3.0E-04	3.8E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
 Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
																		or specific locations.
hitt1 (b)	Fort Union/Smith Coal	Rawhide Mine T51N, R72W, Sec. 11					80					43	0.5	3.0E-04	3.8E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Smith Coal	Rawhide Mine T51N, R72W, Sec. 11					80					44	0.6	2.8E-04	3.5E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
hitt1 (b)	Fort Union/Smith Coal	Rawhide Mine T51N, R72W, Sec. 11					80					42	0.5	3.0E-04	3.8E-06	N/A	confined	Assumed confined based on low S value. K value based on presented T & b values. No well names or specific locations.
cmc2	Fort Union/Smith Coal	Rawhide Mine; T51N, R72W, Sec. 10	150	5/30/05		202-204	5		22.0		Theis	87	17.4	1.9E-04	3.8E-05	N/A	confined	Assumed confined based on low S value. Boundaries present
acc1	Ft. Union/ Canyon Coal	Antelope Mine		6/1/05	1440	204-240	31		12.0		Theis	256	8.3	2.7E-05	8.7E-07	N/A	confined	Assumed confined based on low S value. Assumed K value based on presented T & b values.
acc1	Ft. Union/ Canyon Coal	Antelope Mine		6/1/05	1440	205-240	29		12.0		Theis	318	11.0	2.6E-05	9.0E-07	N/A	confined	Assumed confined based on low S value. Assumed K value based on presented T & b values.
tcc1	Ft. Union/ Canyon Coal	Buckskin Mine; T52N, R 73W, Sec. 25, CA	97.3	10/13/88	264	437-511	70		3.2	1.3	Theis & Jacob	64	0.9	3.0E-04	4.3E-06	N/A	confined	Assumed confined based on low S value.
tcc1	Ft. Union/ Canyon Coal	Buckskin Mine; T52N, R 73W, Sec. 25, CA	21	8/11/88	1440	250-280	62		1.1	1.0	Theis & Jacob	42	0.7	1.2E-02	1.9E-04	N/A	confined	Assumed confined based on 250 ft of overburden.
tcc1	Ft. Union/ Anderson & Canyon	Buckskin Mine; T52N, R72W	199	7/22/76	2850		116		18.2		Theis	576	5.0	2.3E-04	2.0E-06	N/A	confined	Assumed confined based on low S value. Well completed in

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
	Coals																	multiple coals
tcc1	Ft. Union/Anderson & Canyon Coals	Buckskin Mine; T52N, R72W	100	7/22/76	2850	70-205	117		18.2		Theis	549	4.7	5.1E-04	4.4E-06	N/A	confined	Assumed confined based on low S value. Well completed in multiple coals
tcc1	Ft. Union/Anderson & Canyon Coals	Buckskin Mine; T52N, R72W	51	7/22/76	2850	70-200	122		18.2		Theis	560	4.6	1.6E-03	1.3E-05	N/A	confined	Assumed confined based on low S value. Well completed in multiple coals
tcc1	Ft. Union/Anderson & Canyon Coals	Buckskin Mine; T52N, R72W	335	6/6/79	4386	40-80	49		25.7		Theis	68	1.3	1.9E-03	3.9E-05	N/A	confined	Assumed confined based on low S value. Well completed in multiple coals
tcc1	Ft. Union/Anderson & Canyon Coals	Buckskin Mine; T52N, R72W	807	6/6/79	4386	65-170	80		25.7		Theis	107	1.3	6.6E-04	8.3E-06	N/A	confined	Assumed confined based on low S value. Well completed in multiple coals
tcc1	Ft. Union/Anderson & Canyon Coals	Buckskin Mine; T52N, R72W	52	1/6/81	222	74-190	64		18.1		Jacob	716	11.3	3.0E-03	4.7E-05	N/A	confined	Assumed confined based on low S value. Well completed in multiple coals
aha9	Ft. Union/Big George	Johnson County	139	7/6/01	5760	1626-1756	139	173.7	30.0		Theis	22	0.53	2.1E-04	1.51E-06	0.000209	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	118	7/6/01	5760	1701-1804	118	215.4	30.0		Theis	23	0.63	3.0E-04	2.54E-06	0.000299	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	112	7/6/01	5760	1717-1822	112	219.4	30.0		Theis	39	1.13	3.7E-04	3.32E-06	0.000372	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	124	7/6/01	5760	1738-1855	124	259.1	30.0		Theis	34	0.89	2.8E-04	2.29E-06	0.000284	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	119	7/6/01	5760	1772-1860	119	259.1	30.0		Theis	47	1.29	3.0E-04	2.54E-06	0.000302	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	165	7/6/01	5760	1575-1730	166	159.3	30.0		Theis	20	0.4	1.9E-04	1.16E-06	0.000191	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	150	7/6/01	5760	-	150	173.0	30.0		Theis	31	0.68	2.4E-04	1.62E-06	0.000243	confined	static w.l. > top of aquifer
aha9	Ft. Union/Big George	Johnson County	150	7/6/01	5760	1640-1784	153	203.3	30.0		Theis	50	1.11	2.7E-04	1.83E-06	0.000274	confined	static w.l. > top of aquifer

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
aha9	Ft. Union/ Big George	Johnson County	180	7/6/01	5760	1539-1710	180		30.0		Theis	13	0.24	1.8E-04	9.91E-07	0.000178	confined	Assumed confined based on low S value and conditions existing in area around well
aha9	Ft. Union/ Big George	Johnson County	139	7/16/01	5760	1626-1756	139	178.1	45.0		Theis		0.48	2.7E-04	1.95E-06	0.000271	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	118	7/16/01	5760	1701-1804	118	213.4	45.0		Theis		0.66	3.2E-04	2.68E-06	0.000317	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	112	7/16/01	5760	1717-1822	112	223.6	45.0		Theis		0.96	4.5E-04	4.04E-06	0.000453	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	124	7/16/01	5760	1738-1855	124	222.1	45.0		Theis		0.99	3.1E-04	2.49E-06	0.000309	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	119	7/16/01	5760	1772-1860	119	261.3	45.0		Theis		0.94	3.3E-04	2.73E-06	0.000325	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	165	7/16/01	5760	1575-1730	166	245.6	45.0		Theis		0.45	2.3E-04	1.39E-06	0.000229	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	150	7/16/01	5760	-	150	204.5	45.0		Theis		0.68	2.6E-04	1.74E-06	0.00026	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	150	7/16/01	5760	1640-1784	153	153.0	45.0		Theis		0.93	3.3E-04	2.17E-06	0.000325	confined	static w.l. > top of aquifer
aha9	Ft. Union/ Big George	Johnson County	180	7/16/01	5760	1539-1710	180	163.0	45.0		Theis		0.32	2.2E-04	1.23E-06	0.000221	confined	static w.l. > top of aquifer
aha4	Ft. Union/ Big George	Campbell County	2613	5/7/99	4320	753-803	52	252.6	61.2	4.2	Theis	75	1.4	1.2E-04	2.3E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1890	5/7/99	4320	787-850	56	265.1	61.2	5.4	Theis	122	2.2	1.9E-04	3.4E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1299	5/7/99	4320	797-850	56	266.0	61.2	13.8	Theis	101	1.8	9.9E-05	1.8E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1742	5/7/99	4320	828-888	52	279.4	61.2	10.3	Theis	115	2.1	8.3E-05	1.6E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1980	5/7/99	4320	971-1037	59	363.8	61.2	4.3	Theis	115	2.1	2.2E-04	3.7E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1245	5/7/99	4320	798-863	51	263.4	61.2	12.2	Theis	108	2.0	1.4E-04	2.7E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
	George																	thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1232	5/7/99	4320	889-951	58	318.3	61.2	11.5	Theis	115	2.1	1.4E-04	2.4E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1867	5/7/99	4320	880-?	63	265.4	61.2	10.8	Theis	109	2.0	6.9E-05	1.1E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1320	5/7/99	4320	?	61	310.5	61.2	14.3	Theis	94	1.7	1.0E-04	1.6E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1838	5/6/99	360	753-803	52	252.6	64.1		Theis	144	2.6	2.1E-04	4.0E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1838	5/6/99	360	840-898	60	290.4	64.1		Theis	130	2.3	6.7E-05	1.1E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1300	5/6/99	360	797-850	56	266.0	64.1		Theis	86	1.6	1.2E-04	2.1E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
aha4	Ft. Union/ Big George	Campbell County	1300	5/6/99	360	889-951	58	318.3	64.1		Theis	86	1.6	7.3E-05	1.3E-06	N/A	confined	w.l. > top of aquifer. K & S _s based on avg coal thickness = 55 ft
kmcc2, hitt2, wwrc1	Ft. Union/ Wyodak-Anderson	Jacob's Ranch Mine T43N, R70W, Sec. 11	50	3/20/74	4000	25-52	25	17.7	1.0	4.2	Theis	5	0.2	6.9E-04	2.8E-05	N/A	confined	static w.l. > top of aquifer. Assumed K value based on presented T & b values.
cri1, wwrc1	Ft. Union/ Wyodak-Anderson	Caballo Rojo Mine	61	11/7/78	243	138-198	71		6.9	0.4	Jacob	1353	19.0	5.0E-04	7.0E-06	N/A	confined	Assumed confined based on low S value. From Caballo Rojo Permit to Mine Application; well completion data from CD accompanying wwrc1
wwrc1	Ft. Union/ Wyodak-Anderson	Caballo Rojo Mine	30.5	11/7/78	243	186-236	72	122.0	6.9	0.6	Jacob	1112	15.6	7.0E-04	9.7E-06	N/A	confined	Static w.l. > aq. thickness; well completion data from CD accompanying wwrc1
wwrc1	Ft. Union/ Wyodak-Anderson	Caballo Rojo Mine	73	11/7/78	2885	198-268	71	173.0	10.6	2.3	Theis	482	6.8	3.0E-04	4.2E-06	N/A	confined	Static w.l. > aq. thickness; well completion data from CD accompanying wwrc1
wwrc1	Ft. Union/ Wyodak-	Caballo Rojo Mine	41.7	11/7/78	2885	188-263	71	171.0	11.0	3.0	Theis	402	5.7	5.0E-04	7.0E-06	N/A	confined	Static w.l. > aq. thickness; well

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
	Anderson																	completion data from CD accompanying wwrc1
hitt2, wwrc1	Ft. Union/Wyodak-Anderson	Coal Creek Mine T46N, R70W, Sec. 17, BB	31.4	6/13/75	300	109-145	37	71.3	3.6	4.0	Theis	46	1.5	1.0E-03	2.7E-05	N/A	confined	static w.l. > top of aquifer
hitt2, wwrc1	Ft. Union/Wyodak-Anderson	Coal Creek Mine T46N, R70W, Sec. 19, AC	80	5/17/75	240	46-90	34	15.1	43.6	2.9	Theis	1113	32.7	5.6E-04	1.6E-05	N/A	confined	static w.l. > top of aquifer
tbcc2, hitt2	Ft. Union/Wyodak-Anderson	Coal Creek Mine T46N, R70W, Sec. 29, CC	61.4	5/15/75	240	119-139	35	48.1	19.3	2.5	Theis	569	7.3	3.2E-04	9.1E-06	N/A	confined	static w.l. > top of aquifer
tbcc2, hitt2, wwrc1	Ft. Union/Wyodak-Anderson	Coal Creek Mine T46N, R70W, Sec. 32, CA	77.9	6/11/75	240	148-175	35	94.0	16.2	3.5	Theis	256	7.4	4.7E-04	1.3E-05	N/A	confined	static w.l. > top of aquifer
kmcc1	Ft. Union/Wyodak-Anderson	East Gillette/Clovis Mine T40N, R71W, Sec. 29	74	8/7/79	1440	195-275	104		22.0	8.5		218	2.1	6.4E-04	6.2E-06	N/A	confined	Assumed confined based on low S value.
kmcc1	Ft. Union/Wyodak-Anderson	East Gillette/Clovis Mine T50N, R71W, Sec. 20	50	10/22/76	486	217-237	100		3.4	4.6		33	0.3	5.2E-04	5.2E-06	N/A	confined	Assumed confined based on low S value.
kmcc1	Ft. Union/Wyodak-Anderson	East Gillette/Clovis Mine T50N, R71W, Sec. 29	99	8/7/79	1440	200-190	119		22.0	6.4		178	1.5	7.1E-04	6.0E-06	N/A	confined	Assumed confined based on low S value.
kmcc1	Ft. Union/Wyodak-Anderson	East Gillette/Clovis Mine T50N, R71W, Sec. 29	164	8/7/79	1440	170-190	55		22.0	8.2		119	2.2	6.5E-04	1.2E-05	N/A	confined	Assumed confined based on low S value.
kmcc1	Ft. Union/Wyodak-Anderson	East Gillette/Clovis Mine T50N, R71W, Sec. 29	101	11/3/76	816	135-155	99		7.7	2.0		84	0.9	3.2E-03	3.2E-05	N/A	confined	Assumed confined based on low S value.
hitt2	Ft. Union/Wyodak-Anderson	East Gillette/Clovis Mine T50N, R71W, Sec. 29			1956							517		1.1E-01	N/A	0.11000	unconfined	Assumed unconfined based on high S value.

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
		29, AD																
soc1, wwrc1	Ft. Union/Wyodak-Anderson	North Rochelle Mine T42N, R70W Sec. 9	38	7/5/80	2866	290-350	62	227.0	3.0	1.3	Boulton	188	3.0	2.9E-04	4.7E-06	N/A	confined	assumed confined based on saturated thicknesses reported in analysis from North Rochelle Permit to Mine Application & well completion data from CD accompanying wwrc1
hitt2	Ft. Union/Wyodak-Anderson	T47N, R72W, Sec. 7			600							9		1.1E-02	N/A	0.01100	unconfined	Assumed unconfined based on high S value.
hitt2	Ft. Union/Wyodak-Anderson	T47N, R72W, Sec. 7			600							19		1.0E-02	N/A	0.01000	unconfined	Assumed unconfined based on high S value.
wrdc1	Ft. Union/Wyodak-Anderson	Wyodak Mine; T50N, R71W, Sec 33, BB	10	4/21/83	1440	119-178	58	89.0	19.2	12.3	Theis & Jacob	48	1.0	4.0E-03	6.9E-05	N/A	confined	static w.l. > top of aquifer
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	415	3/25/00	864	291-361	93	242.3	25.6		Theis	1512.0	20.2	8.6E-04	9.2E-06	0.00086	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	750	3/25/00	864	307-377	70		25.6		Theis	2044.8	27.3	4.2E-04	5.9E-06	0.00042	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	750	3/25/00	864	307-377	70	257.2	25.6		Theis	2476.8	33.0	1.9E-04	2.7E-06	0.00019	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	360	3/25/00	864	296-366	70	261.4	25.6		Theis	1684.8	22.5	1.3E-04	1.9E-06	0.00013	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	860	3/25/00	864	375-445	70	259.3	25.6		Theis pumping & recovery	1584.0	21.1	1.5E-04	2.1E-06	0.00015	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	470	3/25/00	864	302-362	60	249.2	25.6		Theis pumping & recovery	2736.0	36.5	4.1E-05	6.8E-07	0.00004	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	390	3/25/00	864	302-362	74	256.0	25.6		Theis	1440.0	19.2	1.3E-04	1.8E-06	0.00013	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	750	3/28/00	720	291-361	93	242.4	22.5		Theis	1324.8	17.7	2.7E-04	2.9E-06	0.00027	confined	assumed confined based on low S value
aha8	Wyodak	Belle Ayr	720	3/28/00	720	307-377	70		22.5		Theis	1440.0	19.2	3.4E-04	4.9E-06	0.00034	confined	assumed confined

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
	Coal	Mine T47N, R72W																based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	720	3/28/00	720	307-377	70	258.5	22.5		Theis	1105.9	14.7	2.7E-04	3.9E-06	0.00027	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	170	3/28/00	720	296-366	70	260.8	22.5		Theis	779.0	10.4	6.2E-04	8.9E-06	0.00062	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	460	3/28/00	720	375-445	70	260.0	22.5		Theis pumping & recovery	1081.4	14.4	3.1E-04	4.4E-06	0.00031	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	500	3/28/00	720	302-362	60	249.2	22.5		Theis pumping & recovery	1113.1	14.8	2.3E-04	3.8E-06	0.00023	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	390	3/28/00	720	304-364	60	250.9	22.5		Theis	1009.4	13.5	2.8E-04	4.7E-06	0.00028	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	980	3/31/00	360	291-361	93	243.1	16.1		Theis pumping & recovery	1828.8	24.4	3.6E-04	3.9E-06	0.00036	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	530	3/31/00	360	307-377	70		16.1		Theis pumping & recovery	951.8	12.7	3.9E-04	5.6E-06	0.00039	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	530	3/31/00	360	307-377	70	259.1	16.1		Theis	590.4	7.9	3.3E-04	4.7E-06	0.00033	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	420	3/31/00	360	296-366	70	260.9	16.1		Theis	766.1	10.2	4.2E-04	6.0E-06	0.00042	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	480	3/31/00	360	302-362	74	256.0	16.1		Theis	256.3	3.4	9.0E-05	1.2E-06	0.00009	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	515	3/31/00	360	302-362	60	250.3	16.1		Theis pumping & recovery	1201.0	16.0	3.0E-04	5.0E-06	0.00030	confined	assumed confined based on low S value
aha8	Wyodak Coal	Belle Ayr Mine T47N, R72W	780	3/31/00	360	304-364	60	251.4	16.1		Theis pumping & recovery	1620.0	21.6	1.4E-04	2.3E-06	0.00014	confined	assumed confined based on low S value
aha5	Wyodak Coal	Belle Ayr Mine T47N, R72W, Sec 1, DA							13.0			1400.0		5.6E-04		0.00056	confined	assumed confined based on low S value
aha5	Wyodak Coal	Belle Ayr Mine T47N, R72W, Sec 1, DA							13.0			1540.0		5.4E-04		0.00054	confined	assumed confined based on low S value
aha5	Wyodak Coal	Belle Ayr Mine T47N, R72W							13.0			1400.0		6.0E-04		0.00060	confined	assumed confined based on low S value

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
		R72W, Sec 1, DA																
aha5	Wyodak Coal	Belle Ayr Mine T47N, R72W, Sec 1, DA							13.0			1430.0		3.4E-04		0.00034	confined	assumed confined based on low S value
tbcc1, wwrc1	Wyodak Coal	Black Thunder Mine T43N, R70W, Sec.22	N/A	8/9/73	470	37-97	Assumed 60	96.5	50.0	1.2	Cooper-Jacob	2674	74	1.0E-02	N/A	0.01000	unconfined	Assume coal unconf. by 37 ft overburden and gravity drainage complete; sat. thick. < coal thickness
tbcc1, wwrc1	Wyodak Coal	Black Thunder Mine T43N, R70W, Sec.27	30	6/8/73	210	42-117	Assumed 75		4.6	5.7	Cooper-Jacob	80	2	2.0E-03	N/A	0.00200	unconfined	Assume coal unconf. by 42 ft overburden and gravity drainage complete; sat. thick. < coal thickness, stated unconfined in original analysis
tbcc1	Wyodak Coal	Black Thunder Mine T43N, R70W, Sec.27	24.5	6/8/73	210	42-112	Assumed 70		4.6	5.8	Cooper-Jacob	109	2	1.9E-03	N/A	0.00190	unconfined	Assume coal unconf. by 37 ft overburden and gravity drainage complete; sat. thick. < coal thickness, stated unconfined in original analysis
tbcc1, wwrc1	Wyodak Coal	Black Thunder Mine T43N, R70W, Sec.27	39.5	6/12/73	300	assumed 42-116	Assumed 74		13.0	62.0	Cooper-Jacob	61	2.5	6.9E-04	N/A	0.00069	unconfined	Assume coal unconf.; sat. thickness < assumed coal thickness; overburden 42 ft based on wells BTR-12 and BTR-12B, stated unconfined in original analysis
fump1	Wyodak Coal	Fort Union Mine T50N, R71W, Sec.7		Not reported	Not reported	218-290	80	200.0	Not reported	6.0	Theis	92	1.15	3.2E-04	4.0E-06	N/A	confined	Static w.l.. >depth to top of aquifer
fump1	Wyodak Coal	Fort Union Mine T50N, R71W, Sec.7		Not reported	Not reported	240-310	80	210.0	Not reported	1.0	Theis	92	1.15	4.6E-04	5.8E-06	N/A	confined	Static w.l.. >depth to top of aquifer
fump1	Wyodak Coal	Fort Union Mine T50N, R71W, Sec.7		Not reported	Not reported	260-315	65	203.0	Not reported	2.0	Theis	45	0.71	1.0E-04	1.5E-06	N/A	confined	Static w.l.. >depth to top of aquifer
fump1	Wyodak Coal	Fort Union Mine T50N, R71W, Sec.7		Not reported	Not reported	211-288	65	178.0	Not reported	3.0	Theis	92	1.43	6.1E-04	9.4E-06	N/A	confined	Static w.l.. >depth to top of aquifer
prcc1	Wyodak Coal	N. Antelope Mine T42N, R70W, Sec.	54.4	8/22/95	252	340-400	60		16.5			1472	25	2.3E-04	3.8E-06	N/A	confined	Assume coal confined by 340 ft of overburden.

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
		28																
prcc1	Wyodak Coal	N. Antelope Mine T42N, R70W, Sec. 30	48.6	8/31/95	315	330-390	60		14.5			3980	66	9.9E-04	1.7E-05	N/A	confined	Assume coal confined by 330 ft of overburden.
prcc1	Wyodak Coal	N. Antelope Mine T42N, R71W, Sec. 26	41.7	9/6/95	240	336-396	60		7.3			2824	47	5.8E-04	9.7E-06	N/A	confined	Assume coal confined by 336 ft of overburden.
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	75	6/15/87	240	870-868			3.7		Cooper-Jacob	125	1.3	1.9E-04			confined	Static w.l.. >depth to top of aquifer
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	99	6/15/87	240	860-888			3.7		Cooper-Jacob	99	1.0	2.4E-04			confined	Static w.l.. >depth to top of aquifer
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	65.5	6/15/87	240	861-892	96		3.7		Cooper-Jacob	114	1.2	2.1E-04	2.1E-06		confined	Static w.l.. >depth to top of aquifer
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	75	6/13/87	240	795-849	96		5.2		Cooper-Jacob	116	1.2	2.7E-04	2.8E-06		confined	Static w.l.. >depth to top of aquifer
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	75	7/18/80	900	795-849	96	338.2	3.0	1.8	Cooper-Jacob	154	1.6	1.6E-04	1.7E-06		confined	Static w.l.. >depth to top of aquifer
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	70	7/18/80	900	860-888	76	333.1	3.0	1.8	Cooper-Jacob	3	0.04	1.7E-05	2.2E-07		confined	Static w.l.. >depth to top of aquifer, K assumed from given T and aq thickness
aha7	Wyodak Coal	T46N, R72W, Sec. 16, AC	70	7/16/80	1080	870-868	75	337.1	3.2	1.8	Cooper-Jacob	3	0.04	1.6E-05	2.1E-07		confined	Static w.l.. >depth to top of aquifer, K assumed from given T and aq thickness
aha7	Wyodak Coal	T47N, R72W, Sec. 16		8/9/80	20	665-695		197.0	8.2		Cooper-Jacob	286		7.9E-04			confined	Static w.l.. >depth to top of aquifer
hitt1 (a)	Coal	Buckskin Mine T52N, R72W, Sec. 32					120					584	4.9	2.3E-04	1.9E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal:	Buckskin Mine T52N, R72W, Sec. 32					120					701	5.8	4.8E-04	4.0E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal:	Buckskin Mine T52N, R72W, Sec. 32					120					619	5.2	1.7E-03	1.4E-05	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
hitt1 (a)	Coal:	Buckskin Mine T52N, R72W, Sec. 32					120					568	4.7	2.4E-04	2.0E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal:	Buckskin Mine T52N, R72W, Sec. 32					120					536	4.5	5.8E-04	4.8E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal:	Buckskin Mine T52N, R72W, Sec. 32					120					473	3.9	1.8E-03	1.5E-05	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal:	Buckskin Mine T52N, R72W, Sec. 32					90					1233	13.7	4.9E-04	5.4E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
aha3	Coal:	Caballo Mine; T48N, R71W, Sec. 24	10	7/15/85	1400	63-83	38	51.8	2.3	8.7	Jacob	22.0	0.7	7.0E-04	N/A	0.00070	unconfined	static w.l. < top of aquifer; Assumed K value based on presented T & b values.
aha3	Coal:	Caballo Mine; T48N, R71W, Sec. 24	10	7/15/85	1400	63-83	32	53.0	2.3	11.8	Jacob	12.5	0.5	4.0E-03	N/A	0.00400	unconfined	static w.l. < top of aquifer; Assumed K value based on presented T & b values.
hitt1 (a)	Coal & Sandstone	Buckskin Mine T52N, R72W, Sec. 32					140					898	35.9	4.8E-04	3.4E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal & Sandstone	Buckskin Mine T52N, R72W, Sec. 32					140					898	35.9	3.8E-04	2.7E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
hitt1 (a)	Coal & Sandstone	Buckskin Mine T52N, R72W, Sec. 32					140					898	35.9	8.5E-04	6.1E-06	N/A	confined	Assumed K value based on presented T & b values. No well names or specific locations given.
												MIN	2.99	0.04	1.6E-05	2.1E-07	4.1E-05	

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft-1)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
												MAX	3980.00	74.27	1.1E-01	1.9E-04	1.1E-01	
												MEDIAN	129.60	1.99	3.0E-04	3.8E-06	3.1E-04	
												ARITH MEAN	557.27	8.17	1.7E-03	8.5E-06	3.1E-03	

Wasatch Coals

hitt1 (c)	Wasatch/Felix #1	T47N, R72W, Sec. 7					9					32		2.0E-02	N/A	0.02000	unconfined	Assumed unconfined based on high S value. No well names or specific locations given.
hitt1 (c)	Wasatch/Felix #1	T47N, R72W, Sec. 7					9					96		2.0E-02	N/A	0.02000	unconfined	Assumed unconfined based on high S value. No well names or specific locations given.
hitt1 (c)	Wasatch/Felix #1	T47N, R72W, Sec. 7					9					57		2.0E-02	N/A	0.02000	unconfined	Assumed unconfined based on high S value. No well names or specific locations given.
hitt1 (c)	Wasatch/Felix #1	T47N, R72W, Sec. 7					25					88		1.6E-02	N/A	0.01600	unconfined	Assumed unconfined based on high S value. No well names or specific locations given.

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
												MIN	31.9	N/A	1.6E-02	N/A	0.01600	
												MAX	96.1	N/A	2.0E-02	N/A	0.02000	
												MEDIAN	72.5	N/A	2.0E-02	N/A	0.02000	
												ARITH MEAN	68.2	N/A	1.9E-02	N/A	0.01900	

Wasatch Sands

aha6	Wasatch: sand	Ruby Ranch Project Area				285-305	35	189.1				328	9.4	1.3E-04	3.7E-06	0.00013	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					40					246	6.1	8.2E-05	2.0E-06	0.00008	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					45					426	9.5	1.7E-04	3.8E-06	0.00017	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					45					457	10.2	1.7E-05	3.8E-07	0.00002	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					40					222	5.6	2.8E-05	7.0E-07	0.00003	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					57			1.0		361	0.0	1.1E-04	1.9E-06	0.00011	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					36					199	5.5	3.0E-02	8.3E-04	0.03000	confined	not consistent w/ previously reported T
aha6	Wasatch: sand	Ruby Ranch Project Area					48					747	15.6	9.0E-04	1.9E-05	0.00090	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					35					524	15.0	4.0E-05	1.2E-06	0.00004	confined	Assumed confined in analysis

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
aha6	Wasatch: sand	Ruby Ranch Project Area					55					892	16.2	1.7E-04	3.1E-06	0.00017	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					33					665	20.2	2.3E-06	7.1E-08	0.00000	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					44					487	11.1	5.0E-05	1.1E-06	0.00005	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					42					129	3.1	2.3E-04	5.5E-06	0.00023	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					36					137	3.8	7.8E-05	2.2E-06	0.00008	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					50					340	6.8	7.6E-05	1.5E-06	0.00008	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					50					269	5.4	8.6E-05	1.7E-06	0.00009	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					50					270	5.4	1.1E-04	2.2E-06	0.00011	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					37					238	6.4	5.9E-05	1.6E-06	0.00006	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					55					348	6.3	3.5E-03	6.4E-05	0.00350	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area				273-318	38	193.2				143	3.8	8.3E-05	2.2E-06	0.00008	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					33					207	6.3	6.1E-05	1.8E-06	0.00006	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					39					87	2.2	5.3E-03	1.4E-04	0.00530	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					35					116	3.3	7.3E-04	2.1E-05	0.00073	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					24					76	3.2	6.8E-04	2.8E-05	0.00068	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					44					100	2.3	1.4E-04	3.1E-06	0.00014	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					20					106	5.3	7.2E-05	3.6E-06	0.00007	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					20					61	3.1	2.5E-04	1.2E-05	0.00025	confined	Assumed confined in analysis
aha6	Wasatch: sand	Ruby Ranch Project Area					20					95	4.7	3.3E-05	1.7E-06	0.00003	confined	Assumed confined in analysis
prcc1	Wasatch pumped; obs coal	N. Antelope Mine T41N, R71W, Sec. 5		4/24/90	320	113-173	80		0.5		Wither-spoon	1	0.02	4.1E-03	N/A	0.00410	unconfined	Coal had drawdown during overburden pumping, assume coal communicates with and is unconfined by leaky overburden and gravity drainage complete.
fump1	Wasatch:	Fort Union Mine T50N,		Not reported	Not reported	87-207	120	76.0	Not reported	23.0	Theis recovery	485	4.032	7.0E-04	5.8E-06	N/A	confined	Static w.l. > top of aquifer

POWDER RIVER BASIN OIL & GAS EIS
TECHNICAL REPORT - GROUNDWATER MODELING

Bureau of Land Management
Buffalo Field Office

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
		R72W, Sec.13																
fump1	Wasatch:	Fort Union Mine T50N, R72W, Sec.13		Not reported	Not reported	97-217	115	78.0	Not reported	20.0	Theis recovery	432	3.744	1.6E-04	1.4E-06	N/A	confined	Static w.l.. > top of aquifer
fump1	Wasatch:	Fort Union Mine T50N, R72W, Sec.13		Not reported	Not reported	89-209	120	76.0	Not reported	14.0	Theis recovery	598	4.896	3.9E-04	3.3E-06	N/A	confined	Static w.l.. > top of aquifer
fump1	Wasatch:	Fort Union Mine T50N, R72W, Sec.13		Not reported	Not reported	92-248	80	87.0	Not reported		Theis recovery	1214	14.4	4.0E-04	5.0E-06	N/A	confined	Static w.l.. > top of aquifer
cmc2	Wasatch:	Rawhide Mine; T51N, R72W, Sec. 11	40	7/7/83	9900	167-187	44		16.5	4.2	Neuman	178		1.3E-01	N/A	0.13000	unconfined	Assume unconfined based on high S value.
cmc2	Wasatch:	Rawhide Mine; T51N, R72W, Sec. 11	120	7/7/83	9900	162-182	45		16.5	1.3	Neuman	106		1.9E-01	N/A	0.19000	unconfined	Assume unconfined based on high S value. Static w.l.. after drilling = 133.5 ft
mel1	Wasatch: Ft. Un ss	Sheridan County T4N, R84W, Sec.5		6/61?	1440		12	15.0	Not reported		Theis & Cooper-Jacob	13	1.1	3.5E-04	2.9E-05	N/A	confined	Assume confined based on low S value.
mel1	Overburd. Ft. Union ss	Sheridan County T55N, R84W, Sec.27		6/61?	80		4		Not reported		Theis recovery	1	0.3	9.0E-05	2.3E-05	N/A	confined	Assume confined based on low S value.
hitt2	Overburd. Wyodak-Anderson Coal	T41N, R70W, Sec. 17			1260				86.0		Hantush, Jacob	200		7.9E-05	2.0E-05	N/A	confined	Assume confined based on low S value. Antelope Creek; test employed pumping well & 3 obs wells at varying unspecified distances; data presented is averaged
hitt2	Overburd. Wyodak-Anderson Coal	T44N, R71E, Sec. 34			960				85.0		Theis, Jacob	352		1.4E-04	3.5E-05	N/A	confined	Assume confined based on low S value. Stewart; test employed pumping well & 1 obs wells at an unspecified distance; data presented is averaged
hitt2	Overburd. Wyodak-Anderson Coal	T44N, R71W, Sec. 34, DA			900							352		1.4E-04	3.5E-05	N/A	confined	Assume confined based on low S value.

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/Unconfined (see comments)	Comments
tcc1	Intbrdn between Anderson & Rider Coals	Buckskin Mine; T52N, R 73W, Sec. 25, BA	50	7/27/88	720	293-335	23		2.7	5.7	Theis & Jacob	38	3.1	8.0E-05	2.0E-05	N/A	confined	Assume confined based on low S value and 293 ft overburden.
cri1, wwrc1	Wasatch	Caballo Rojo Mine	43.75	11/8/78	75	55-155	57	49.0	7.0	0.6	Theis	182	3.2	2.1E-02	5.3E-03	N/A	confined	Static w.l.. >aq. thickness; well completion data from CD accompanying wwrc1
cri1, wwrc1	Wasatch	Caballo Rojo Mine	22.6	11/8/78	75	70-120	57	53.8	7.0	2.6	Jacob	117	2.0	3.2E-03	8.0E-04	N/A	confined	Static w.l.. >aq. thickness; well completion data from CD accompanying wwrc1
												MIN	1.3	0.0	2.3E-06	7.1E-08	0.00000	
												MAX	1213.9	20.2	1.9E-01	5.3E-03	0.19000	
												MEDIAN	222.5	5.1	1.4E-04	3.7E-06	0.00011	
												ARITH MEAN	291.8	6.1	9.2E-03	1.8E-04	0.01185	
Wasatch Clay Confining Units																		
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		9.5E-05		5.3E-05			Reported hydraulic conductivity is Kz, t=4600
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		5.5E-05		2.1E-05			Reported hydraulic conductivity is Kz, t=6215
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		5.5E-05		1.3E-05			Reported hydraulic conductivity is Kz, t=6215
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		4.4E-05		1.3E-05			Reported hydraulic conductivity is Kz, t=6215
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		7.7E-05					Reported hydraulic conductivity is Kz, t=2850

PRB Hydrogeologic Data from Pumping Tests

Ref No.	Aquifer	Location	Observ. Dist. from Test Well (ft)	Date Tested	Test Period (min)	Screened Interval (ft)	Reported Aquifer Thickness (ft)	Static W.L. (fbgs)	Pump Rate (gpm)	Final Draw-down (ft)	Analysis Method	T (ft ² /day)	K (ft/day)	Reported Storage Coef. (S)	Specific Storage (ft ⁻¹)	Specific Yield (S _y = S)	Confined/ Unconfined (see comments)	Comments
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		3.1E-02		6.2E-05			Reported hydraulic conductivity is Kz, t=68
aha6	upper confining unit for sand	Ruby Ranch Project Area									Flexible-wall permeability		2.4E-05					Reported hydraulic conductivity is Kz
aha6	upper confining unit for sand	Ruby Ranch Project Area									Neuman-Wither-spoon		7.7E-05					Reported hydraulic conductivity is Kz
												MIN	2.4E-05		5.3E-05			
												MAX	3.1E-02		6.2E-05			
												MEDIAN	6.6E-05		2.1E-05			
												ARITH MEAN	4.0E-03		2.4E-03			

REFERENCES - PRB PUMPING TESTS

Ref No.	Reference	Area	Aquifer Data
aha1	Project files (PR 120) containing PRB depositional environment study. Author and date unknown.	PRB, Campbell Co	Summary table of well test results including T & S. 8 wells in Anderson Coal, 4 wells in overburden.
aha4	Applied Hydrology Associates. October 1999. Proprietary technical report.	PRB, Campbell Co	Multiple obs well test results for numerous pumping tests in Big George coal; T, S, Ss, K, k. Good data.
aha3	Applied Hydrology Associates. 1985. Project files (PR 85 003) for Carter Mining Company Caballo Mine south of Gillette.	PRB, Gillette, WY	Raw test data and analysis plots for multiple-well pumping test in July 1985. T & S (shallow, unconfined Wyodak coal)
aha2	Applied Hydrology Associates. 1985. Project files (RH-12-14) for summary of hydrologic testing at Rocky hill No. 1 Site.	PRB, Rocky Hill	Well construction data, stratigraphy and injection test analysis (T, K values)
aha5	Applied Hydrology Associates. 1998. Project files for hydrologic testing at the Belle Ayr Mine.	PRB, Belle Ayr Mine	T, S values derived for 4 wells during a multi-well pumping test
aha6	Hydrologic testing at the Ruby Ranch Project. 1999. From U.S. NRC and WDEQ Application, Appendix D6.	PRB, Ruby Ranch	Well construction data, aquifer test results for single-well and multi-well pumping tests in sands. Includes some vertical hydraulic conductivity data.
aha7	Applied Hydrology Associates. 1987. Project files for hydrologic testing of Lindsey (T46N, R72W, Sec. 16) and Red Top (T47N, R72W, Sec. 16) sections, Campbell County, WY.	PRB, Campbell Co	Well construction data, aquifer test results for multiple-well pumping tests.
aha8	Applied Hydrology Associates. 2000. Project files for hydrologic testing at the Belle Ayr Mine, Campbell County, WY.	PRB, Belle Ayr Mine	Well construction data, aquifer test results for multiple-well pumping tests.
aha9	Applied Hydrology Associates. December 2001. Proprietary technical report.	PRB, Johnson County	Multiple obs well test results for numerous pumping tests in Big George coal; T, S, Ss, K, k. Good data.
ak1	Anderson & Kelly. [date and report title unknown]. Wright Water & Sewer District RJ-4 well strat. & as-built, diagram and test data.	PRB, Wright, WY	RJ-4 well test data - drawdown & recovery tests results; ave T for composite of 13 Fort Union ss beds open to 13 screened intervals. [includes S from Theis type-curve method -invalid for single well test]
cmc1	Carter Mining Company. March 1982 (rev October 1982). Caballo Mine permit application 433-T3. Appendix D-6, Addendum E.	PRB, Caballo mine, south of Gillette	Appendix D-6. Well and aq test text and data for ovbd sand. Pumped well and 5 obs wells. T& S.

REFERENCES - PRB PUMPING TESTS

Ref No.	Reference	Area	Aquifer Data
cmc2	Carter Mining Company. November 1993. Rawhide Mine 240-T3 permit application. Appendix D6.	PRB, Rawhide Mine north of Gillette	Appendix D-6. 25-30 well test results. Coal, alluvium, ovrb, and clinker tests
df1	Dry Fork Coal Company. March 2000. Permit No. 599.	PRB, Dry Fork Mine	Appendix D-6, Table D-6-2. Summary of 44 aquifer test results. Mostly single well tests; 5 S results
fump1	Fort Union Mine Partnership. December 1990. Fort Union Mine permit application. Appendix D6	PRB, Fort Union Mine, Gillette	Appendix D-6 info prepared by Western Water Consultants and Hydro-Engineering. Well and aq data for 2 pit areas, Tables D6-3 and D6-4; alluv, clinker, coal, ovrb, sands,
hitt1	Hittman Associates. February 1978. Monitoring and modeling of the shallow groundwater in the Powder River Basin, Annual Technical Report. Prepared for U.S. Bur. Mines. Hittman Associates, Inc., Englewood, Colorado.	PRB	Listing of private and coal company monitoring wells in MT and WY. Summary of aquifer test data (T & S) obtained from 4 sources in 4 different townships (Table IV-3, pp. IV-6 & IV-7) in WYO (3) and MT (Decker). (a) "Analysis of Constant Yield Tests of Wells CT-1, CT-2 and OT-2B Buckskin Mine Property, Campbell Co., WY" for Shell Oil Co. (b) "Report on Aquifer Tests for U.S. Coal Lease W-5036 Near Gillette, WY" for Carter Oil Co. (c) "Evaluation of Native Hydraulic Characteristics of the Felix Coal and Associated Strata" for U.S. Energy Research & Development Administration by Lawrence Livermore Lab.
hitt2	Hittman Associates. July 1982. Monitoring and modeling of shallow Ground Water Systems in the Powder River Basin. (Report and Appendices in sep volumes). Prepared for U.S. Bur. Mines. Hittman Associates, Inc., Englewood, Colorado.	PRB	Summary of pumping test results (4 sites, T & S, Table III-1, p. III-9); Appendix E includes 5 page summary of PRB aquifer test data (T & S) for ovbd and coal, which IDs mining company source.
mdsl1	Montana Department of State Lands and U.S. Office of Surface Mining. April 1985. Draft EIS, Consolidation Coal Company CX Ranch Mine, Big Horn County, Montana.	PRB, west of Decker, MT	Limited to summary. Table 2-3, ch 31. Provides T and S ranges for alluvium, ovbrdn, Anderson/Dietz and Canyon coals. Fig. 2-5, p. 33 is potentiometric surface map of Anderson-Dietz coal seam for July 1980 levels.

REFERENCES - PRB PUMPING TESTS

Ref No.	Reference	Area	Aquifer Data
mel1	Lowry, M.E. and T. R. Cummings. 1966. Ground-water resources of Sheridan County, Wyoming. U.S. Geological Survey Water-Supply Paper 1807.	Sheridan Co., WY	Table 2 lists pumping test results for 6 wells; 3 ss aqs., 1 Wasatch coal, and 2 alluv. Log for coal well 54-81-14bc on p. 68
osmre1	Office of Surface Mining Reclamation and Enforcement. March 1989. Proposed mining plan, Dry Fork Mine, Campbell County, Wyoming. Final environmental impact statement OSMRE-EIS-24.	PRB, Dry Fork Mine	Appendix D includes hydraulic parameter summary tables (pp. D-8 & D-9) for several mines in Dry Fork Mine area.
prcc1	Powder River Coal Company. June 1998. North Antelope/Rochelle Complex mine permit 569-T5. Appendix D-6	PRB, N. Antelope/Rochelle mines, Wright	Appendix D-6. Well and aq data Tables D6-4 and D6-5; ovr, coal, alluv
rehm1	Rehm, B.W., G. H. Groenewold, and K.A. Morin. 1980. Hydraulic properties of coal and related materials, Northern Great Plains. Ground Water, v. 18, no.6, Nov-Dec.	ne WY, e MT., ND, Alberta	No well-specific data. Ave hydraulic parameters for coal and other materials by State and Province mine sites.
sno1	Snoeberger, D. F. January 1977. Field hydrology tests of explosively fractured coal. Lawrence Livermore Laboratory, Livermore, CA.B6	PRB, Hoe Ck, sw of Gillette	Tested explosively fract. Felix No. 2 coal for in-situ coal gasification experiment. Gives k ranges by distance from shot holes. Summary, individual well results limited.
sto1	Stone, R. and D. F. Snoeberger. February 1977. Cleat orientation and areal hydraulic anisotropy of a Wyoming coal aquifer. (preprint of paper). Lawrence Livermore Laboratory, Livermore, CA	PRB, Hoe Ck, sw of Gillette	Gives summary results of anisotropic k of Felix No. 2 coal using 1 pumping well and 3 obs wells; constant rate test.
tbcc1	Thunder Basin Coal Company. July 1999. Black Thunder Mine permit 233. Appendix D-6.	PRB, Black Thunder Mine, Wright	Appendix D-6. Well and aq data Tables D-6.1.1 and D-6.1.2; ovr, Wyodak-Anderson coal, shale, scoria, Wasatch Sand
tbcc2	Thunder Basin Coal Company. 1990. Coal Creek Mine permit update. Water Rights & Ground Water Hydrology Sections II.F.1, II.F.2, and II.F.3	PRB, Coal Creek Mine	Table II.F-2.4 summarizes pumping test results and calculated aquifer coefficients. Table II.F-2.1 summarizes well completions. Table II.F-2.1.11 shows tabulated aquifer test data and data plots.

REFERENCES - PRB PUMPING TESTS

Ref No.	Reference	Area	Aquifer Data
tcc1	Triton Coal Company. December 1989. Buckskin Mine T-3 permit application.	PRB, Buckskin Mine north of Gillette	Appendix D-6. Anderson and Canyon coals combined hydraulic data for 10 tests; ovr and clinker tests. 79 monitoring wells in current mine database
wrdc1	Wyodak Resources Development Corp. 1983. Wyodak Mine permit 232-T5. Appendix D-6	PRB, Wyodak Mine, Gillette	Appendix D-6, Table 1, p. D6.3-91 includes test results for M-26 and M-27 in 1983 report by Western Water Consultants. Also result for M-3, M-4, M-5, M-13, M-14, M-15M-18, M-19
wvv1	Van Voast., W.A. and R.B. Hedges. December 1975. Hydrogeologic aspects of existing and proposed strip coal mines near Decker, southeastern Montana. Montana Bureau of Mines and Geology Bulletin 97.	PRB, Decker, MT	Limited. Table 1, p. 5; 5 T&K values. No S or S _y values. Table 2 lists USGS & MBMG water-well data for Decker area. Plates include piezometric maps for D-1 and D-2 coals
wwa1	Wester-Wetstein & Associates. July 1999. Transmittal letter and file folder of selected figures and data for water supply wells in Gillette area provided by Larry Wester.	PRB, Gillette, WY	Location map, lithologic log, as-built drawing, and composite Fort Union ss data for City of Gillette S-series wells, Antelope Valley, Am Rd, Sleepy Hollow, and Bell Knob supply wells.
wwc1	Western Water Consultants. June 1983. Results of aquifer pumping tests of monitoring wells M-26 and M-27 at the Wyodak mine, Gillette, Wyoming. <i>In</i> Wyodak Mine permit 232-T5. For Wyodak Resources Development Corp., Gillette, WY. Western Water Consultants, Inc., Sheridan, Wy.	PRB, Wyodak Mine, Gillette	Appendix D-6 of permit application. Table 1, p. D6.3-91 includes test results for M-26 and M-27 in 1983. Pumping test data pulled from Permit to Mine Application for applicable mines.
wwrc1	Wyoming Water Resources Center. November 1997. A study of techniques to assess surface and groundwater impacts associated with coal bed methane and surface coal mining, Little thunder Creek Drainage, Wyoming. Wyoming Water Resources Center, University of Wyoming, Laramie	PRB, Little Thunder Creek, Wright	Appendix F. Pumping test results summarized for several Wright area mines. Accompanying CD includes basic well and water level data.
hag1	Hagmaier, J.L. August 1971. Groundwater flow, hydrochemistry, and uranium deposition in the Powder River Basin, Wyoming. PhD dissertation, University of North Dakota, Grand Forks.	PRB	Appendix B. Water level & chemistry data for 208 wells in Ft. Union & Wasatch Formations in 1970.

REFERENCES - PRB PUMPING TESTS

Ref No.	Reference	Area	Aquifer Data
kmcc1	Kerr-McGee Coal Corporation. 1981. East Gillette Federal Mine permit. Appendix D-6.	PRB, East Gillette/Clovis Mine	Appendix D-6. Table D6.1-1 summarizes well completions. Table D6.1-6 summarizes pumping test results and calculated aquifer coefficients.
acc1	Antelope Coal Company. 1999. Antelope Coal Mine permit revision. Appendix D6.	PRB, Antelope Mine	Appendix D6. Table V-1 summarizes pumping test results and calculated aquifer coefficients. Section 2 contains lithologic logs of observation wells.
kmcc2	Kerr-McGee Coal Corporation. 1982. Jacob's Ranch Mine permit. Appendix D-6.	PRB, Jacob's Ranch Mine	Appendix D-6. Table D6.1-1 summarizes well completions. Table D6.1-4 summarizes pumping test results and calculated aquifer coefficients. Addendum D6A contains pumping test data plots and analyses.
amax1	Amax Coal Company. 1998. Belle Ayr Mine permit 214. Volume 5, Section 2.6.2	PRB, Belle Ayr Mine	Table 2.6.2-1 summarizes monitoring well completion data. Table 2.6.2-2 summarizes pumping test data and analysis.
cri1	Caballo Rojo, Inc. 2000. Revised Caballo Rojo Mine permit 511. Appendix D-6.	PRB, Caballo Rojo Mine	Table 2.6-2 summarizes well completion data. Table 2.6-3 summarizes monitoring well status. Table 2.6-4 summarizes pumping test data and analysis.
soc1	Shell Oil Company Mining. 1982. Revised North Rochelle Mining Permit Application. Appendix D-6 & Addendum D-6C.	PRB, North Rochelle Mine	Table D-6-2 summarizes well completion data. Table D-6-3 summarizes pumping test data and analysis. Addendum D-6C includes tabulated aquifer test data and data plots.